DOCUMENT RESUME

ED 477 743 SO 034 744

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TITLE	Assessing the Effectiveness of a Student-Centered College Classroom.
PUB DATE	2003-00-00
NOTE	12p.
PUB TYPE	Reports - Research (143) -- Tests/Questionnaires (160)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Classroom Environment; *College Instruction; Constructivism (Learning); Factor Analysis; Feasibility Studies; *General Education; Higher Education; Instructional Effectiveness; *Student Centered Curriculum
IDENTIFIERS	Performance Based Objectives

ABSTRACT

Faculty members at St. Mary's University of Minnesota have been engaged in a process to develop a more student-centered curriculum. Administration and faculty taking the lead in this endeavor have begun to embrace much of the literature in the area of constructivism as a philosophical foundation for guiding this change. The result is the near completion of a performance-based, outcome-oriented general education program that received faculty approval. This general education program is divided into three components: (1) the content; (2) skills; and (3) dispositions expected of a 4-year graduate of the institution. Each of these components is divided into more specific subcategories agreed upon by the faculty. For each sub-category a team of faculty volunteered to develop specific performance-based outcomes and exemplars for which students must demonstrate competency in order to meet the general education requirements. To ascertain whether the faculty was capable of creating constructivist-based classroom environments, a study utilized the Constructivist Learning Environment Survey for the Social Sciences (CLES-SS) in a redesigned form to assess the constructivist nature of two selected U.S. government courses at St. Mary's University. The CLES instrument was piloted to pre- and inservice teachers (n=290). Results were then used in an exploratory factor analysis to determine reliability among the items. Results of this pilot of the CLES-SS indicated that the instrument may have possibilities for application within college level social science classrooms. Attached are T-CLES teacher and student forms. (BT)

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Assessing the Effectiveness of a Student-centered College Classroom

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Introduction

The movement to bring "best practices" pedagogy to college level classrooms has been at the forefront of many institutions of higher learning in this country. Criticism abounds from a variety of constituencies including the media, legislature, and our customers. Standards movements in this country emphasizing a more constructivist orientation to the K-12 environment have started to filter into the realm of higher education, particularly through schools of education.

Faculty members at Saint Mary's University of Minnesota, have been actively engaged for over five years in a process to develop a more student-centered curriculum, as mandated by the university president. Administration and faculty taking the lead in this endeavor have begun to embrace much of the literature in the area of constructivism as a philosophical foundation for guiding this change. The result is the near completion of a performance-based, outcome-oriented, general education program that recently received faculty approval. This general education program is divided into three components: the content, skills, and dispositions expected of a four-year graduate of our institution. Each of these components is divided into more specific sub-categories agreed upon by our faculty. For each sub-category a team of faculty volunteered to develop specific performance-based outcomes and exemplars that students must demonstrate competency in to meet our general education requirements.

In the course of this process, a question transpired: is the general faculty membership of our institution prepared to teach and assess in the type of environment required for students to meet the performance-based requirements of the new general education program? More specifically and philosophically, is our faculty capable of creating constructivist-based classroom environments that will enable our students to effectively demonstrate their learning in the manner expected under our new program? And, furthermore, how do we know what a constructivist learning environment looks like? How would we determine if it existed and to what extent the environment promoted student learning?

The purpose of this study was to utilize the Constructivist Learning Environment Survey for the Social Sciences (CLES-SS) as a means of assessing the constructivist nature of two selected American government courses at Saint Mary's University. The courses were selected for ease of accessibility, and as an opportunity to pilot the CLES-SS instrument.

Methodology:

During the 1998-99 academic year, five teacher education institutions in conjunction with SciMath^{MN} collaborated on developing instruments designed to measure beginning teacher effectiveness. This collaboration known as the Teacher Research Network (TRN) met throughout the academic year and the summer to investigate recent research activities on beginning teachers and to develop a plan of study for the TRN that would consider our needs and resources for addressing this issue.

Based upon the work completed by the Teacher Research Network (TRN) a group of researchers began to investigate ways to measure learning environments consistent with optimal student learning as described in the literature. These researchers redesigned a quantitative instrument based upon the Constructivist Learning Environment Survey (CLES) developed by Taylor and Fraser (1991). The CLES instrument includes a student version and a teacher version, designed to elicit information from both perspectives on a classroom learning environment.

Development of the CLES^{MN}

The classroom learning environment is the social atmosphere in which learning takes place. Fraser (1994) regards these learning environments as "the social-psychological contexts or determinants of learning. Several studies have supported the significance of the learning environment in predicting students' attitudes toward learning" (Cannon, 1997, Niederhauser, et. al., 1999). Cannon (1997) argued that the classroom learning environment was the strongest predictor of student attitude toward science in all grades. The CLES was developed to "enable teacher-researchers to monitor their (teacher) development of constructivist approaches to teaching school science..." (Taylor, Dawson, and Fraser, 1995).

The CLES instrument (Taylor, Dawson, and Fraser, 1991) was originally developed with 28 items in four scales – autonomy, prior knowledge, negotiation, and student-centeredness. A revised version with 30 items in five scales (personal relevance, uncertainty, critical voice, shared control, and student negotiation) was later created (Taylor, et. al., 1995) and was used in our pilot during the spring of 1999.

The CLES instrument was piloted to 290 pre- and in-service teachers. The results of the 290 surveys were then used in an exploratory factor analysis to determine reliability among the items. The results supported the use of the five-scale structure but revealed nine items that did not appear to go with others in the scale. A look at squared multiple correlations for the particular items, though, revealed seven items that did not appear to go well with the others in their scale. Comments were also gathered from participants taking the CLES. Frequently, redundancy among items was identified as a distraction in the instrument.

As a result of the analysis we determined that two items from each scale needed to be dropped, and that fourteen items needed to be reworded for the teacher version. Additional clarification was directed toward the student version to make it clearer for use at the upper elementary level. These instruments were then used as a basis for determining the versions developed for the CLES^{MN} instruments.

During the fall of 1999 Dr. McClure decided to utilize the CLES^{MN} instruments as a guide for developing an instrument for use in college level social science classrooms. Using the National Social Science Standards document and the guidelines set forth by the state of Minnesota for social science teaching licensure, Dr. McClure modified the CLES^{MN} instruments. These modified instruments are the Social Science Learning Environment Survey (CLES-SS) for teachers and students (Appendices A and B).

Two American government classes at Saint Mary's University, taught by the same professor, were chosen for piloting the two instruments. The professor administered the student

instrument to the classes and completed the teacher version. The results were placed into a spreadsheet and analyzed for patterns.

Several patterns emerged from the data analysis that appeared to be consistent across both classes. Firstly, the results of the analysis appear to be very consistent with the results that have emerged over the past studies conducted by the TRN using the CLES^{MN}. These consistencies include an obviously lower average response in the area of "learning to learn", or shared control, particularly with regard to questions 13, 14, and 15. These questions deal specifically with the processes of planning and assessment. Students appear to feel as though they have only some input into these processes. The professor appears to agree with this perspective from an analysis of the data. The second lowest scoring area as determined in the data is negotiation (questions 17-20). Still student responses are in the sometimes-often realm, indicating that they generally perceive that intra-personal communication is valued in these classrooms. These results also correspond to the patterns that developed in CLES^{MN} study, and to a recent study conducted with nine different elementary schools (Johnson, 2000).

Table 1- CLES-SS Results

	Personal Relevance					Uncertainty					Critical Voice					Shared Control					Student Negotiation				
	1	2	3	4	Avg	5	6	7	8	Avg	9	10	11	12	Avg	13	14	15	16	Avg	17	18	19	20	Avg
Prof.	**4**	**4**	**3**	**4**	**3.8**	**4**	**3**	**4**	**3**	**3.5**	**4**	**5**	**5**	**5**	**4.8**	**2**	**2**	**4**	**4**	**3.0**	**2**	**2**	**2**	**2**	**2**
Student Avg Class 1	4.2	3.9	4.3	4.4	4.2	3.6	3.4	4.2	3.9	3.8	3.7	3.9	4.7	4.3	4.2	2.7	2.7	2.9	3.3	2.9	3.6	3.6	3.5	3.5	3.6
Student Avg Class 2	4.2	3.9	3.8	4.3	4.0	3.7	3.5	4.0	4.0	3.8	3.9	4.0	4.5	4.3	4.2	3.0	3.5	3.1	3.7	3.3	3.7	3.7	3.8	3.7	3.7

Student scores were higher on the categories of relevancy and critical voice. The item that students scored the highest was number 11, which focuses on their willingness to ask the instructor for clarification. We could conclude that these students perceive this instructor to be very approachable within the classroom. Of particular notability is the discrepancy between student and professor perceptions toward student negotiation in these classrooms. Student scores in this category are comparable to many classroom environments studied during the CLES^{MN}

study. The professor's responses are significantly lower than the vast majority of responses found in the CLES^{MN} study. It may be concluded that the professor is not observing this behavior among his students, or that his expectations or beliefs about student negotiation are significantly different than his students. In either case further investigation into this phenomenon would be necessary.

With the exception of the results from professor's responses, this analysis indicated a strong correlation between the results of this study and the results compiled by the TRN in their similar study of science classrooms. This tends to indicate that the results of this pilot may be reliable as compared to the CLES^{MN} study.

Conclusion

The results of this pilot of the CLES-SS indicate that the instrument may have possibilities for application within college level social science classrooms. The literature is supportive regarding the positive relationship between constructivist learning environments and enhanced student learning (Brooks and Brooks, 1994; Cannon, 1997; Johnson, 2000; and Niederhauser, 1999). While the research supports the development of such environments, how can we determine if and to what extent they exist? This study has presented the results of a pilot of a modified instrument that has shown effectiveness in measuring such environments in science and mathematics classrooms at the K-12 levels. If properly utilized in college classrooms, the CLES-SS instrument could provide a valuable perspective into the characteristics of that learning environment. The identification of such characteristics that could provide valuable information to assist instructors in their attempt to improve the learning of their students.

Resources

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Taylor, P., Dawson, V., and Fraser, B. (1995, April). Classroom learning environments under transformation: A constructivist perspective. Paper presented at the Annual Meeting of the American Research Association, San Francisco, CA.

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T-CLES+ What Happens with Technology in my Classroom--Teacher Form

1) Purpose of the questionnaire:

This questionnaire asks you to describe your perceptions of important aspects of the classroom in which you teach. There are no right or wrong answers. Your opinion about what you see in your classroom is what is wanted.

2) How to answer each question:
On the next few pages you will find 20 sentences. For each sentence, *circle only one number* corresponding to your answer.

Example:

	Almost Always	Often	Some-times	Seldom	Almost Never
In this class…					
Students pay attention to each other's ideas.	5	4	3	2	1

- If you think that students in this class *almost always* pay attention to other's ideas, circle the letter "5".
- If you think that students in this class *almost never* pay attention to other's ideas, circle the letter "1".
- Or you can choose the number "4", "3", or "2" if one of these seems like a more accurate answer.

3) Filling in the answer sheet.
When you are finished, you will be instructed to fill in the corresponding answers on the "bubble" answer sheet.

4) Completing the questionnaire
Please give an answer for every question.

Learning about the world (Relevancy)

In this class…	Strongly agree	Agree	Some times	Disagree	Strongly disagree
1. Students learn about technology in and outside of school.	5	4	3	2	1
2. When learning about new technology students are able to relate it to learning experiences and/or possible applications in and outside of school.	5	4	3	2	1
3. Students learn how technology resources (e.g. puzzles, writing tools, digital cameras, drawing tools) for problem solving, communication, and illustration of thoughts, ideas, and stories)	5	4	3	2	1
4. Students learn how use input (e.g. mouse, keyboard, remote) and output devices successfully operate computers, VCRs, audiotapes and other technologies	5	4	3	2	1

Learning about technology (Uncertainty)

In this class…	Strongly agree	Agree	Some times	Disagree	Strongly disagree
5. Students learn that technological applications cannot always provide answers to problems.	5	4	3	2	1
6. Students learn that technological applications have been developed over time by people intent on developing better tools to help mankind solve problems	5	4	3	2	1
7. Students learn that technological applications and processes can be biased by people's cultural values, and/or personal perspectives and opinions.	5	4	3	2	1
8. Students learn when to utilize or not utilize technological applications during problem solving situations in their in and out-of-school life.	5	4	3	2	1

		Almost Always	Often	Some-times	Seldom	Almost Never
Learning to speak out (Critical Voice)						
With regard to technology, in this class…						
9.	Students feel safe questioning what or how they are being taught with regard to technology.	5	4	3	2	1
10.	Students feel they learn better when they are allowed to question what or how they are being taught with regard to technology.	5	4	3	2	1
11.	It's OK for students to ask for clarification about activities that are confusing with regard to technology.	5	4	3	2	1
12.	It's acceptable for students to express concern about anything that gets in the way of their learning about technology or its uses.	5	4	3	2	1
Learning to learn (Shared Control)						
With regard to technology, in this class…						
13.	Students help me to plan what they are going to learn with regard to technology..	5	4	3	2	1
14.	Students help me to decide how well they are learning with regard to technology..	5	4	3	2	1
15.	Students help me to decide which activities work best for them with regard to technology.	5	4	3	2	1
16.	Students let me know when they need more/less time to complete activities utilizing, or related to technology.	5	4	3	2	1
Learning to communicate (Student Negotiation)						
With regard to technology, in this class…						
17.	Students talk with other students about how to solve problems related to technology.	5	4	3	2	1
18.	Students explain their ideas regarding technology to other students.	5	4	3	2	1
19.	Students ask other students to explain their ideas regarding technology.	5	4	3	2	1
20.	Students are asked by others to explain their ideas regarding technology.	5	4	3	2	1

What Happens in My Social Science Classroom--Student Form

1) Purpose of the questionnaire:

This questionnaire asks you to describe your perceptions of important aspects of the social science classroom in which you are a student. There are no right or wrong answers. Your opinion about what you see in this classroom is what is wanted.

2) How to answer each question:
On the next few pages you will find 30 sentences. For each sentence, *circle only one number* corresponding to your answer.

Example:

In this class…	Almost Always	Often	Some-times	Seldom	Almost Never
I pay attention to each other's ideas.	5	4	3	2	1

- If you think that students in this class *almost always* pay attention to other's ideas, circle the letter "5".
- If you think that students in this class *almost never* pay attention to other's ideas, circle the letter "1".
- Or you can choose the letter "4", "3", or "2" if one of these seems like a more accurate answer.

3) Filling in the answer sheet.
When you are finished, you will be instructed to fill in the corresponding answers on the "bubble" answer sheet.

4) Completing the questionnaire
Please give an answer for every question.

Learning about the world

In this class…		Almost Always	Often	Some-times	Seldom	Almost Never
1.	I've learned about the world in and outside of school.	5	4	3	2	1
2.	New learning relates to experiences or questions I have about the world in and outside of school.	5	4	3	2	1
3.	I've learned how social science is part of my in and out-of-school life	5	4	3	2	1
4.	I've learned interesting things about the world in and outside of school.	5	4	3	2	1

Learning about social science
In this class…

5.	I've learned that social science cannot always provide answers to problems.	5	4	3	2	1
6.	I've learned that explanations to phenomena have changed over time	5	4	3	2	1
7.	I've learned that social science is influenced by people's cultural values and opinions.	5	4	3	2	1
8.	I've learned that social science is a way to raise questions and seek answers	5	4	3	2	1

	Almost		Some-		Almost

		Always	Often	times	Seldom	Never
Learning to speak out						
In this class...						
9.	I feel safe questioning what or how they I'm being taught.	5	4	3	2	1
10.	I feel I've learned better when I am allowed to question what or how I'm being taught.	5	4	3	2	1
11.	It's OK for students to ask for clarification about activities that are confusing.	5	4	3	2	1
12.	It's acceptable for students to express concern about anything that gets in the way of their learning.	5	4	3	2	1
Learning to learn						
In this class...						
13.	Students help plan what we are going to learn.	5	4	3	2	1
14.	Students help decide how well we are learning.	5	4	3	2	1
15.	Students help decide which activities work best for them.	5	4	3	2	1
16.	Students let the instructor know when they need more/less time to complete activities.	5	4	3	2	1
Learning to communicate						
In this class...						
17.	Students talk with other students about how to solve problems.	5	4	3	2	1
18.	Students explain their ideas to other students.	5	4	3	2	1
19.	Students ask other students to explain their ideas.	5	4	3	2	1
20.	Students <u>are asked</u> by other students to explain their ideas.	5	4	3	2	1

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